

Poverty, time, and place: variation in excess mortality across selected US populations, 1980-1990

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Abstract

Study objective—To describe variation in levels and causes of excess mortality and temporal mortality change among young and middle aged adults in a regionally diverse set of poor local populations in the USA.

Design—Using standard demographic techniques, death certificate and census data were analysed to make sex specific population level estimates of 1980 and 1990 death rates for residents of selected areas of concentrated poverty. For comparison, data for whites and blacks nationwide were analysed.

Setting—African American communities in Harlem, Central City Detroit, Chicago's south side, the Louisiana Delta, the Black Belt region of Alabama, and Eastern North Carolina. Non-Hispanic white communities in Cleveland, Detroit, Appalachian Kentucky, South Central Louisiana, Northeastern Alabama, and Western North Carolina.

Participants—All black residents or all white residents of each specific community and in the nation, 1979-1981 and 1989-1991.

Main results—Substantial variability exists in levels, trends, and causes of excess mortality in poor populations across localities. African American residents of urban/northern communities suffer extremely high and growing rates of excess mortality. Rural residents exhibit an important mortality advantage that widens over the decade. Homicide deaths contribute little to the rise in excess mortality, nor do AIDS deaths contribute outside of specific localities. Deaths attributable to circulatory disease are the leading cause of excess mortality in most locations.

Conclusions—Important differences exist among persistently impoverished populations in the degree to which their poverty translates into excess mortality. Social epidemiological inquiry and health promotion initiatives should be attentive to local conditions. The severely disadvantaged mortality profiles experienced by urban African Americans relative to the rural poor and to national averages call for understanding.

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being of communities. The health of reproductive age women directly influences the health of the next generation.^{1 2} Working age adults play critical roles as economic providers and caretakers in families. In low income African American communities, adults in this age group often face multiple obligations in supporting family economies and caretaking systems.^{3 4} Yet, national studies indicate that the disproportionately high rates of disease and disorders suffered by African American or low income people are pronounced for young through middle aged adults.⁵⁻⁸ Excess morbidity and mortality in this age group are greatest among African Americans in poverty.⁹⁻¹¹ High levels of early health deterioration in this population may be both cause and consequence of expanded caretaking obligations among the relatively healthy.^{5 12}

Excess mortality rates in poor populations, themselves, may vary with geographical differences. In particular, rural Americans in the first half of the 20th century enjoyed longer life expectancies than urban dwellers.^{13 14} Evidence based on more recent cohorts is mixed,¹⁵⁻¹⁸ and suggests little, if any, mortality advantage for rural compared with urban dwellers in young and middle adulthood.^{8 19} However, with some resurgence of infectious disease entities as important causes of death in urban areas and general perceptions of central cities as having become more dangerous and unhealthy in the most recent decades,^{20 21} the fortunes of rural dwellers, even those in poverty, may have again increased relative to their urban counterparts. In addition, important interactions between race, poverty, and rural/urban residence may exist, but be unobserved in analyses of national data sets where only main effects of residence are estimated as a product of averaging across rural compared with urban dwellers.

In an earlier study we compared the mortality experience of young and middle aged adults across a select group of white and African American local areas in 1990.¹⁰ Relative to whites nationwide, levels of excess mortality varied across the local populations. The findings hinted that members of urban poor populations might be at substantially higher risk of early death than members of rural poor populations.

We extend this work¹⁰ by describing the mortality experience of an expanded set of impoverished populations that includes a larger number of rural populations and covers two time periods. By analysing data for 1980 and 1990, we shed light on the dynamics of temporal mortality level change in highly impoverished

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Adult health during the reproductive and working ages is important and reflects the well

Table 1 Summary data on the study areas, 1980 and 1990*

Area	Year	Number of inhabitants†	Mean family income (1990 \$)	Families below the poverty level‡ (%)
<i>US population</i>				
Total	1980	226 545 805	39 441	9.6
	1990	248 709 873	43 803	10.0
Whites	1980	189 035 012	41 276	7.0
	1990	199 827 064	46 330	7.0
Blacks	1980	26 482 349	26 788	26.5
	1990	29 930 524	28 659	26.3
<i>Blacks</i>				
Harlem	1980	115 191	20 530	33.4
	1990	101 697	24 174	33.1
Central City Detroit	1980	135 362	22 265	38.5
	1990	98 833	19 841	44.3
Southside Chicago	1980	144 634	19 348	46.7
	1990	101 895	16 651	58.2
Delta Louisiana	1980	107 371	16 704	48.0
	1990	101 928	15 524	48.1
Black Belt Alabama	1980	99 684	17 666	45.1
	1990	93 695	17 222	48.7
East North Carolina	1980	99 161	20 928	34.9
	1990	107 573	20 802	32.8
<i>Whites</i>				
Cleveland	1980	114 720	30 261	16.4
	1990	104 207	27 714	21.4
Detroit	1980	200 938	35 682	10.9
	1990	126 752	29 334	22.0
Appalachian Kentucky	1980	113 078	21 828	32.9
	1990	109 794	21 628	34.6
South Central Louisiana	1980	88 123	35 926	12.8
	1990	87 682	29 274	18.9
Northeast Alabama	1980	165 972	29 217	14.3
	1990	167 037	30 480	13.6
West North Carolina	1980	161 521	28 098	14.5
	1990	167 524	30 675	12.0

*Data are from the 1980 and 1990 US censuses. †Numbers shown refer to only black residents or only white residents, depending on the area studied. ‡The poverty levels were those defined by the Bureau of the Census.

populations. We focus, in particular, on how the HIV/AIDS epidemic and homicide may have influenced changes in mortality.

Methods

POPULATIONS

Our level of analysis encompassed all African American or non-Hispanic white residents, ages 15–64, of 12 regionally diverse impoverished areas, consisting of aggregated census tracts or ZIP Codes in urban areas, and groups of counties in rural areas (parishes in the state of Louisiana). The areas included African American residents of urban communities in Harlem, Central City Detroit, or Chicago's south side; and in rural communities in the Louisiana Delta, Black Belt region of Alabama, or Eastern North Carolina; and non-Hispanic white residents of urban areas in Cleveland and Detroit; in a poor mountain area in Appalachian Kentucky (a region where some of the poorest US whites reside); and from poor rural communities in South Central Louisiana, Northeastern Alabama, or Western North Carolina. For comparison, we analysed data for whites and blacks nationwide.

The appendix describes the urban neighborhoods and rural counties or parishes that make up each area. Specific census tract/ZIP Code identifiers for the urban areas are available from the authors. In table 1 we report summary economic information for each population. Reflecting the national distribution of income, the African American populations were often substantially less well off than the white study populations. Appalachian Kentucky was the only white population with a poverty rate exceeding that of blacks nationwide. Other-

wise, among whites, rural/southern populations tended to be better off economically than urban/northern ones.

The local areas were selected based on comparatively low race specific mean family income and relatively high percentages of families with incomes below the poverty threshold. They were not randomly selected areas of concentrated poverty, but were chosen to reflect racial and geographical diversity given data constraints. Each population was sufficiently large to perform fine grained mortality analyses among young through middle aged adults. For African Americans, this size requirement limited us to major cities or to southern rural areas. As the death certificate data were provided by state vital statistics offices, we were limited to states that included geographical identifiers in their files and, for areas with large Hispanic populations, that separated non-Hispanic from Hispanic whites. (For example, we could not study Chicago whites for this reason.)

As data permitted we included local populations from our earlier 1990 analysis.¹⁰ We were able to maintain six of the eight original local populations. All of these populations were also quite poor in 1980, with the exception of the white Detroit population. In 1980, that population was less advantaged than whites nationwide (11% of families had incomes below the poverty threshold, compared with 7% for whites nationwide), but it was better off than any other study population and far better off than it became a decade later. Other local populations that experienced smaller, but noticeable, increases in their concentration of poverty were blacks in Chicago (from 47% in 1980 to 58% in 1990) and Detroit (from 39% to 44%), and whites in Cleveland (16% to 21%) and Louisiana (13% to 19%).

ESTIMATION PROCEDURES

We combined population specific death certificate information for 1979–1981 and 1989–1991 with age stratified counts of men and women in each population taken from the 1980 and 1990 census, respectively, to calculate age and sex specific death rates, overall and resulting from specific causes of interest. To mitigate biases because of census undercounting, we adjusted population counts using national undercount adjustments.

We computed several measures of mortality. We computed summary measures including age adjusted rate ratios (RRs) and age standardised annual excess death rates (EDRs).^{22–23} To ensure that the reported measures are comparable across populations, our calculations constituted direct standardisation on the age distribution of the US white population by sex.²⁴ For each local population, we calculated the number of deaths that would be expected in the US white population if it faced the age and cause specific death rates of the local population. For the RRs, we divided expected by observed deaths in the US white population. We calculated the EDRs as $100\,000 \times (\text{expected deaths} - \text{observed deaths}) / \text{US white population}$.

Table 2 Measures of mortality among blacks and whites 15 to 64 years old in selected populations, according to sex, 1980 and 1990

	Year	Annual death rate	Total number of deaths	Age standardised annual excess death rate	Age adjusted rate ratio (95% confidence intervals)	p 45*	p 65**	YOLL†
<i>Total US male population</i>								
Blacks	1980	809	62 093	332	1.70 (1.68, 1.71)	0.89	0.60	5.59
	1990	791	69 439	374	1.90 (1.88, 1.91)	0.88	0.62	5.78
Whites	1980	477	312 382	0	1.00 (1.00, 1.00)	0.94	0.74	3.36
	1990	417	282 076	0	1.00 (1.00, 1.00)	0.94	0.77	3.10
<i>Black men</i>								
Harlem	1980	1172	1 541	695	2.46 (2.33, 2.58)	0.80	0.50	8.92
	1990	1713	1 600	1296	4.11 (3.91, 4.31)	0.71	0.37	11.33
Central City Detroit	1980	1182	1 577	705	2.48 (2.35, 2.60)	0.82	0.48	8.47
	1990	1163	1 881	746	2.79 (2.66, 2.92)	0.81	0.50	8.63
South Side Chicago	1980	1432	1 551	955	3.00 (2.85, 3.15)	0.78	0.42	9.79
	1990	1713	1 222	1296	4.11 (3.88, 4.34)	0.73	0.37	11.71
Delta Louisiana	1980	716	573	239	1.50 (1.38, 1.63)	0.89	0.65	5.33
	1990	808	583	391	1.94 (1.78, 2.10)	0.91	0.60	5.40
Black Belt Alabama	1980	791	567	314	1.66 (1.52, 1.80)	0.89	0.61	5.74
	1990	755	516	338	1.81 (1.65, 1.97)	0.91	0.63	5.39
East North Carolina	1980	925	780	448	1.94 (1.80, 2.07)	0.87	0.55	6.19
	1990	906	781	489	2.17 (2.02, 2.33)	0.89	0.57	6.13
<i>White men</i>								
Cleveland	1980	886	1 005	409	1.86 (1.74, 1.97)	0.88	0.58	6.28
	1990	717	713	300	1.72 (1.59, 1.85)	0.91	0.64	4.96
Detroit	1980	730	1 595	253	1.53 (1.45, 1.61)	0.91	0.63	5.19
	1990	838	898	421	2.01 (1.88, 2.14)	0.88	0.60	6.20
Appalachian Kentucky	1980	762	767	285	1.60 (1.48, 1.71)	0.90	0.63	5.44
	1990	574	602	157	1.38 (1.27, 1.49)	0.92	0.70	4.41
South Central Louisiana	1980	589	491	112	1.24 (1.13, 1.34)	0.92	0.70	4.40
	1990	498	420	81	1.19 (1.08, 1.31)	0.93	0.73	3.75
Northeast Alabama	1980	542	873	65	1.14 (1.06, 1.21)	0.93	0.71	3.88
	1990	544	968	127	1.30 (1.22, 1.39)	0.93	0.71	3.83
West North Carolina	1980	504	808	27	1.06 (0.98, 1.13)	0.94	0.73	3.69
	1990	394	705	-23	0.94 (0.87, 1.01)	0.95	0.78	2.94
<i>Total US female population</i>								
Blacks	1980	469	36 487	217	1.86 (1.84, 1.88)	0.95	0.75	3.06
	1990	439	38 825	214	1.95 (1.93, 1.97)	0.95	0.77	2.89
Whites	1980	252	164 519	0	1.00 (1.00, 1.00)	0.97	0.86	1.66
	1990	225	149 859	0	1.00 (1.00, 1.00)	0.98	0.87	1.50
<i>Black women</i>								
Harlem	1980	575	819	323	2.28 (2.12, 2.44)	0.91	0.71	4.41
	1990	759	803	534	3.38 (3.15, 3.61)	0.87	0.65	5.56
Central City Detroit	1980	629	807	377	2.50 (2.33, 2.67)	0.90	0.69	4.69
	1990	580	960	355	2.58 (2.42, 2.75)	0.92	0.71	3.96
South Side Chicago	1980	692	911	440	2.75 (2.57, 2.93)	0.92	0.66	4.51
	1990	794	720	569	3.53 (3.27, 3.79)	0.88	0.63	5.49
Delta Louisiana	1980	440	387	188	1.75 (1.57, 1.92)	0.95	0.77	2.88
	1990	473	372	249	2.11 (1.89, 2.32)	0.94	0.75	3.11
Black Belt Alabama	1980	416	352	164	1.65 (1.48, 1.82)	0.94	0.78	3.05
	1990	425	342	200	1.89 (1.69, 2.09)	0.95	0.77	2.82
East North Carolina	1980	438	402	186	1.74 (1.57, 1.91)	0.94	0.76	3.04
	1990	421	423	197	1.88 (1.70, 2.05)	0.95	0.77	2.78
<i>White women</i>								
Cleveland	1980	464	556	213	1.84 (1.69, 2.00)	0.95	0.75	3.06
	1990	371	360	147	1.65 (1.48, 1.82)	0.96	0.80	2.37
Detroit	1980	359	874	107	1.43 (1.33, 1.52)	0.96	0.80	2.41
	1990	428	440	203	1.90 (1.73, 2.08)	0.95	0.77	2.83
Appalachian Kentucky	1980	335	333	84	1.33 (1.19, 1.48)	0.96	0.82	2.36
	1990	312	321	87	1.39 (1.23, 1.54)	0.97	0.82	2.15
South Central Louisiana	1980	307	258	56	1.22 (1.07, 1.37)	0.97	0.83	2.04
	1990	256	214	32	1.14 (0.99, 1.29)	0.96	0.86	1.89
Northeast Alabama	1980	252	415	0	1.00 (0.91, 1.10)	0.97	0.86	1.71
	1990	283	508	58	1.26 (1.15, 1.37)	0.96	0.84	2.04
West North Carolina	1980	228	366	-24	0.91 (0.81, 1.00)	0.98	0.87	1.59
	1990	192	339	-32	0.86 (0.76, 0.95)	0.98	0.89	1.33

*P45 = probability of survival to age 45. **P65 = probability of survival to age 65. †YOLL = average years of life lost between ages 15 and 65.

We used Greville's method^{23 24} to derive probabilities of survival to various ages for 15 year olds living in the study populations. We also calculated average years of life lost between ages 15 and 65 in each population using standard life table methods.²⁵ Using standard multidecrement life table techniques,^{25 26} we estimated how many of the years of life lost between ages 15 and 65 could be attributed to a particular cause of death, taking into account competing mortality risks.

We analysed deaths by underlying cause using diagnostic categories of the ninth revision of the International Classification of Diseases. We examined a broad array of causes but report on the following ones found to be the most important in explaining death rate disparities: circulatory disease (390–459), cancer (140–

208), accidents (E800–E949), HIV/AIDS (042–044), homicide (E960–E969), infectious disease, pneumonia and influenza (001–041, 045–139, 480–487), and a separate category combining all remaining causes.

Results

SUMMARY MEASURES OF MORTALITY

African Americans nationwide or in local areas experience a substantial annualised rate of excess deaths relative to whites nationwide (see table 2). The magnitude of this excess is generally less for women than for men and in rural/southern populations compared with urban/northern ones. So too, African American men in the urban/northern locales experience RRs as high as 4.11 relative to whites nationwide, while African American women in the rural

south experience RRs hovering around 1.75. Residents of poor rural/southern populations tend to do about as well, or in some cases, better than the black national average on either summary measure.

Most of the poor white populations exhibit excess mortality relative to whites nationwide, but this excess is generally smaller than for poor African American populations and there are specific instances of little or no excess in rural/southern poor white populations. The advantage to poor white women compared with poor white men is smaller than among poor African Americans. An urban/northern-rural/southern divide is also suggested for poor whites, but it, too, is less dramatic than among poor African Americans. Generally members of the white populations fare substantially better than members of the black, yet, whites in the poor, urban/northern localities experience EDRs and RRs of roughly comparable size to those experienced by blacks nationwide or by residents of the African American poor rural/southern areas.

CHANGES OVER TIME

Between 1980 and 1990 national death rates fell slightly more for whites than blacks and the gap between African Americans in poor local areas and whites nationwide increased in almost all cases. While excess mortality among the three urban/northern populations was roughly comparable in 1980, in 1990 residents of Harlem and Chicago did notably worse than residents of all other localities studied, including Central City Detroit. Among women in 1980, Harlem residents fared better than those in Chicago or Detroit, but by 1990 fared substantially worse than their counterparts in Detroit and comparably to those in Chicago. While evident in 1980, by 1990 the urban/rural divide had grown substantially among African American populations, because increases in excess deaths were smaller in the rural/southern than in the urban/northern populations.

Changes in excess mortality between 1980 and 1990 were modest among the white study populations. Only the poor white population in Detroit clearly experienced an increase, while all of the remaining poor white populations remained stable or gained some improvement.

OTHER MORTALITY MEASURES

Almost all white men or women can expect to survive to age 45 and more than four fifths of white women and three quarters of white men can expect to survive to age 65 (see final three columns of table 2). Differences between 1980 and 1990 are slight. Residents of the poor white rural/southern populations face approximately the same probabilities of survival to or through middle age as whites nationwide, while those residing in Detroit, Cleveland, and Appalachian Kentucky fare worse in their probabilities of survival than whites nationwide. The age profiles of mortality in these three white populations are comparable to blacks nationwide and blacks residing in rural/southern study areas.

Residents of the African American urban/northern populations fare the worst. Men face lower probabilities of survival to age 45 than those in poor white populations; sometimes they are less likely to survive to age 45 than white men are to survive to age 65. The chances of survival to age 65 for men in poor, African American urban/northern populations are never more than fifty fifty. Women residents of these localities face only about a two thirds chance of survival to age 65. Between 1980 and 1990, residents of Harlem and Chicago's south side witnessed notable decreases in their probability of survival to or through middle age.

Variation across populations in the average number of years of life lost (YOLL) between ages 15 and 65 is pronounced. Blacks, men, and urban residents lose more years of life than others. Among the African American local populations, the differential between urban and rural dwellers grew between 1980 and 1990. Residents of Harlem and Chicago's south side experienced especially large increases in average years of life lost over this time period. By 1990, African American men in these localities experienced an average of over 11 years of life lost, almost twice the number for blacks nationwide and almost four times the number for whites. While the absolute number of YOLL for women residents of Harlem or Chicago were lower, the excess compared with blacks or whites nationwide was of similar proportion.

CAUSES OF EXCESS MORTALITY

Decompositions of excess death rates show circulatory diseases to be important contributors to excess mortality in every poor population (see table 3). They constitute the leading cause of excess death in both years for men and women in all localities, except for Harlem men, often outpacing other contributors to excess deaths by a wide margin—an order of magnitude in some localities. In 1980, for Harlem men, excess deaths attributable to homicide exceed those resulting from circulatory diseases; in 1990 circulatory disease deaths increased sufficiently to surpass those attributable to homicide, but are exceeded by AIDS deaths. For Harlem women in 1990, AIDS became the second leading cause of excess deaths. In Chicago, AIDS deaths to men are notable in 1990, but account for a much smaller proportion of the total excess than in Harlem. Elsewhere, AIDS deaths are not particularly important contributors to excess mortality.

For women in the poor populations, African American or white, homicide deaths never contribute more than 11% of the total excess deaths and, in most areas, contribute between zero and 5%. Neither does homicide contribute to excess deaths of men in the white populations in North Carolina, Alabama or Louisiana. For men in all other populations, white or African American, homicide does contribute to excess mortality. Among African American men in Harlem, Chicago, Detroit and Louisiana, the contribution is sizeable, accounting for at least 20% of excess deaths in each of those

Table 3 Causes of excess mortality among residents of selected populations, ages 15 to 64, 1980 and 1990

		National death rate per 100 000 in white men						
	Year	Circulatory disease	Cancer	Accident	Homicide	HIV	Infect/pneu/ influenza	Other
	1980	177	108	72	14	0	9	97
	1990	123	103	54	12	23	11	92
Number of excess deaths per 100 000 (age standardised)								
Black men								
United States	1980	92	57	9	73	0	20	82
	1990	95	61	11	73	38	23	72
Harlem	1980	95	66	-50	175	0	39	370
	1990	205	118	20	175	296	150	332
Central City Detroit	1980	189	69	2	176	0	39	231
	1990	192	76	-2	187	38	37	217
South Side Chicago	1980	315	152	-4	212	0	45	235
	1990	310	168	109	241	79	82	308
Delta Louisiana	1980	105	14	37	66	0	13	4
	1990	168	88	52	37	-10	8	49
Black Belt Alabama	1980	125	5	67	41	0	19	57
	1990	114	37	83	32	-8	10	69
East North Carolina	1980	163	79	35	36	0	35	98
	1990	169	97	39	37	7	30	109
White men								
Cleveland	1980	165	55	21	56	0	9	104
	1990	138	52	13	18	21	-3	63
Detroit	1980	118	21	-4	27	0	5	84
	1990	138	56	7	62	-1	18	142
Appalachian Kentucky	1980	78	44	82	49	0	6	26
	1990	51	25	58	23	-20	1	20
South Central Louisiana	1980	38	17	55	-5	0	0	7
	1990	52	23	29	-5	-5	3	-15
Northeast Alabama	1980	31	4	30	-1	0	-2	4
	1990	64	19	26	1	-15	-1	35
West North Carolina	1980	19	-16	11	-2	0	5	10
	1990	1	-15	17	-2	-22	-3	2
		National death rate per 100 000 in white women						
	Year	Circulatory disease	Cancer	Accident	Homicide	HIV	Infect/pneu/ influenza	Other
	1980	70	96	21	4	0	6	55
	1990	52	93	18	3	2	6	50
Number of excess deaths per 100 000 (age standardised)								
Black women								
United States	1980	106	28	0	13	0	10	60
	1990	89	32	2	12	13	14	53
Harlem	1980	97	24	-11	29	0	23	161
	1990	137	53	2	20	99	72	152
Central City Detroit	1980	146	49	3	34	0	16	130
	1990	146	39	-2	40	15	20	97
South Side Chicago	1980	214	97	-4	26	0	16	92
	1990	193	79	22	41	10	43	181
Delta Louisiana	1980	114	15	1	16	0	8	33
	1990	152	23	17	4	1	5	46
Black Belt Alabama	1980	74	-9	14	12	0	1	71
	1990	117	8	12	12	3	8	40
East North Carolina	1980	92	10	10	6	0	17	52
	1990	101	21	3	6	4	13	49
White women								
Cleveland	1980	87	38	2	14	0	8	63
	1990	72	33	4	4	-2	1	35
Detroit	1980	47	32	-3	3	0	1	27
	1990	93	30	0	12	2	7	59
Appalachian Kentucky	1980	45	9	1	7	0	4	18
	1990	40	20	17	4	-2	1	7
South Central Louisiana	1980	32	-2	10	-1	0	6	11
	1990	20	16	8	-1	-2	-4	-5
Northeast Alabama	1980	9	-13	9	0	0	-3	-1
	1990	41	-4	20	3	-2	0	0
West North Carolina	1980	-1	-18	2	1	0	1	-9
	1990	-4	-26	2	0	-2	1	-3

populations in 1980. However, between 1980 and 1990 the absolute numbers of homicide deaths among men remained relatively stable while the percentage of excess deaths accounted for by homicide witnessed notable declines. In Harlem, homicide deaths decreased from 25% of excess deaths to men in 1980 to 14% in 1990; in Chicago, from 22% to 19%; and in the Delta Louisiana population, from over a quarter (28%) in 1980 to only 10%

in 1990. Among black men in Detroit, the percentage of excess deaths attributable to homicide among men stayed stable at 25% in both time periods, while white men in Detroit are the only group to experience an increase in both absolute number and percentage of excess deaths accounted for by homicide.

Between 1980 and 1990, unlike excess deaths attributable to homicide, deaths to most other causes rose in urban/northern poor African

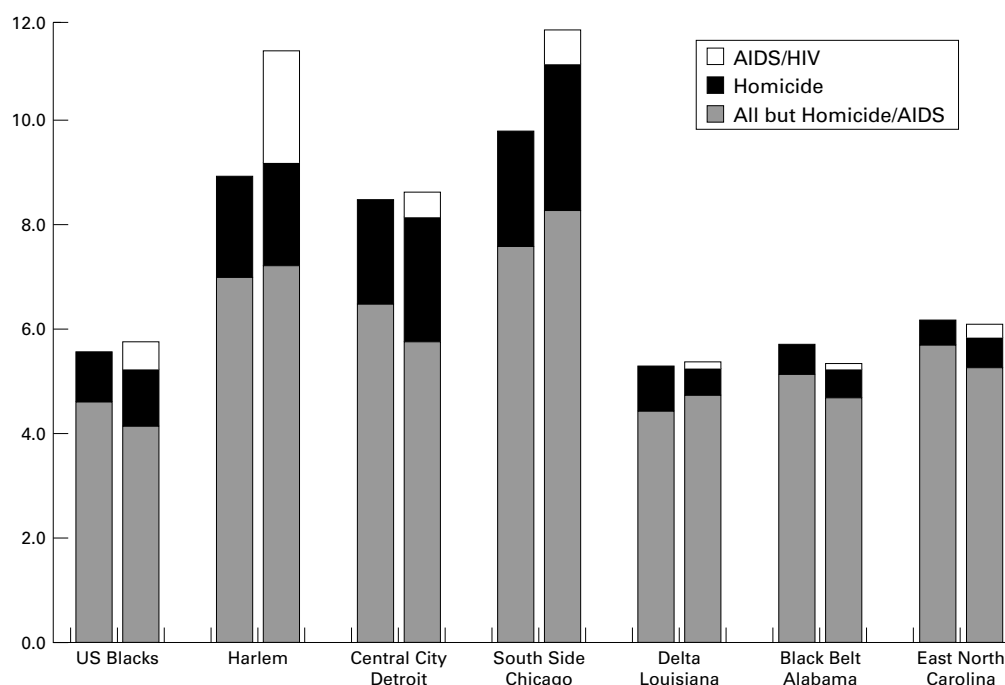


Figure 1 Years of life lost by cause, 1980 and 1990, black men.

American localities. In addition to AIDS, excess deaths attributable to circulatory deaths, cancer deaths, accidental deaths, and deaths attributable to infections rose in Harlem, often dramatically. For example, cancer deaths doubled for men or women, while excess circulatory disease deaths doubled for men and rose by 40% for women. African Americans in Chicago and Detroit also experienced increases in several causes of death.

Accidents contribute notably to excess deaths in rural/southern populations, African American or white, and are the leading cause of excess deaths among men in Appalachian

Kentucky in both years. They are of lesser importance in the urban/northern populations, although Harlem and Chicago residents experienced increases in the number and proportion of excess deaths attributable to accidents between 1980 and 1990. For example, among Chicago men, accidents did not contribute to excess deaths in 1980, but by 1990 contributed 109 or 9% of excess deaths.

AIDS or homicide deaths disproportionately kill people earlier in their adult lives than other important causes such as circulatory diseases or cancers. Thus, these causes of death might take a large toll on the younger members of the

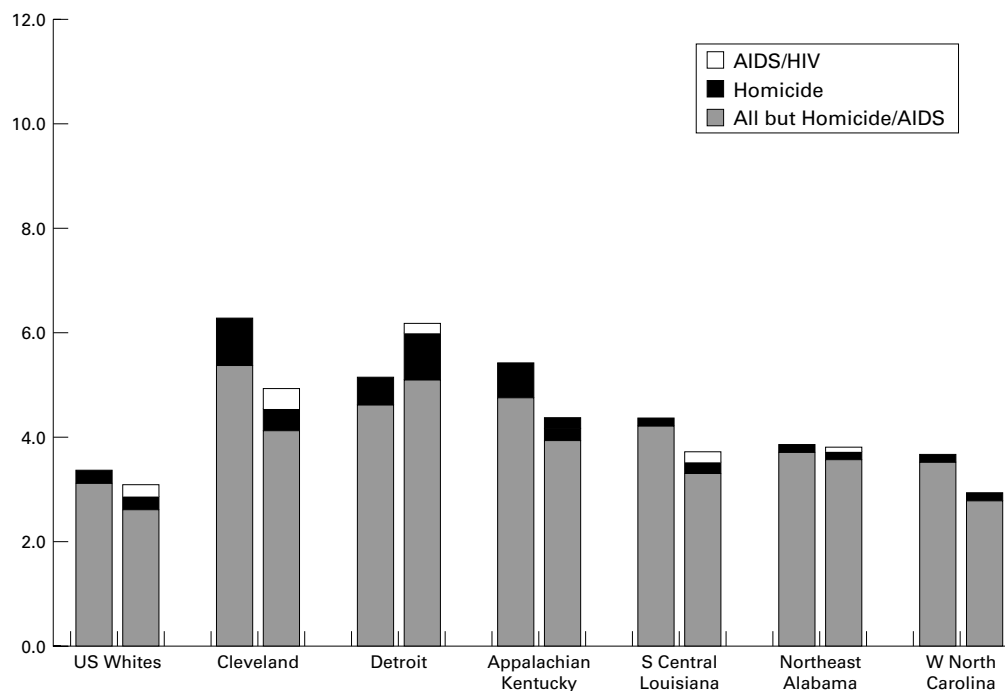


Figure 2 Years of life lost by cause, 1980 and 1990, white men.

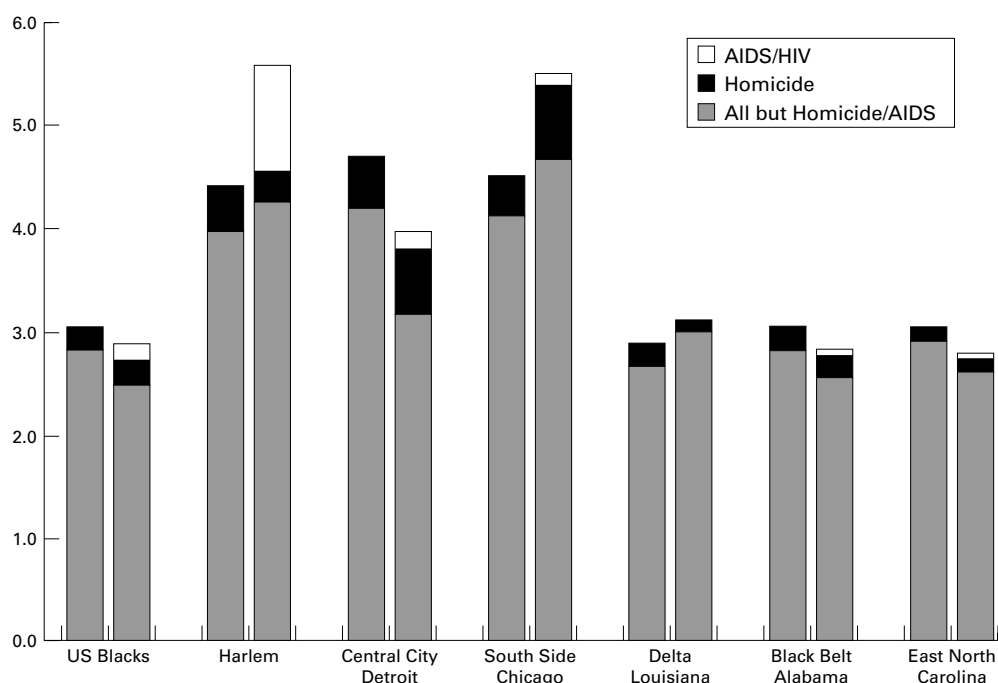


Figure 3 Years of life lost by cause, 1980 and 1990, black women.

15 to 65 year-old age group under study. To gauge this, the bar graphs in figures 1–4 subdivide the average years of life lost according to the fraction attributable to AIDS, homicide, and all other causes. Using the average years of life lost as the denominator highlights the contribution of AIDS or homicide to mortality in the younger part of the age distribution under study, because those who die at younger ages (that is, those who are more likely to die from AIDS or homicide) will contribute more to the average years of life lost than those who die at older ages (that is, those who are more likely to die from circulatory disease or cancer).

Even with this “magnification” of the importance of deaths attributable to AIDS or homicide, these causes alone do not go far in explaining the general observed mortality differences (that is, those by race, sex, poverty, or region, all of which, while reduced, would have remained substantial in the absence of AIDS or homicide deaths). However, AIDS or homicide deaths do account for the increased number of YOLL between 1980 and 1990 for black men nationwide and in Detroit. In several additional localities, improvements over the decade would have been more notable in their absence. Of greatest impact, most of the

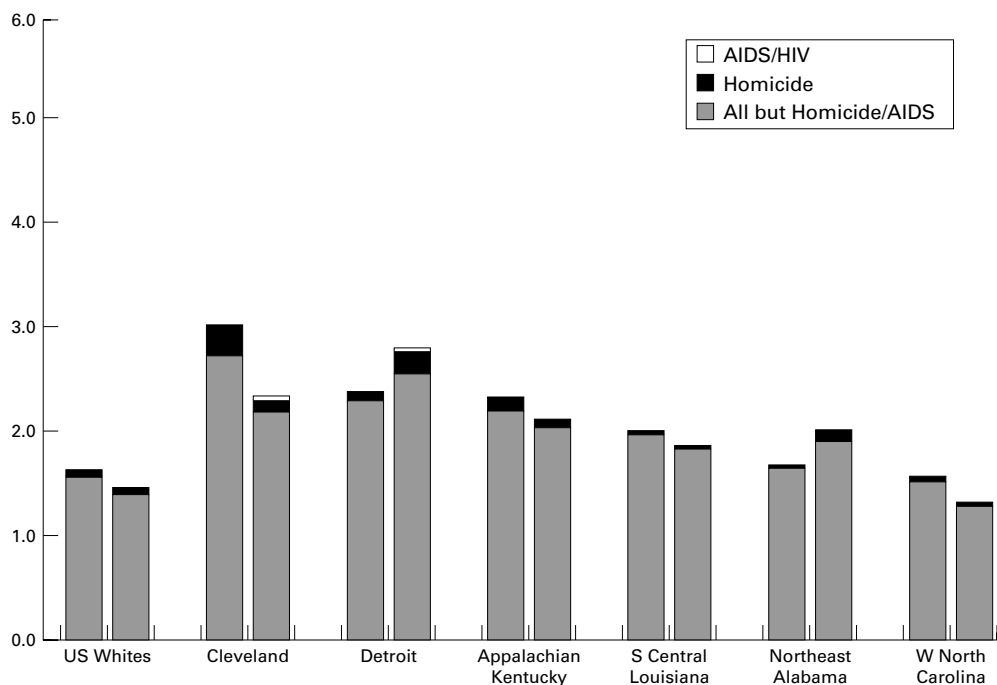


Figure 4 Years of life lost by cause, 1980 and 1990, white women.

substantial increase in YOLL in Harlem between 1980 and 1990 can be accounted for by deaths to these two causes. In the absence of the AIDs epidemic, YOLL for Harlem men might well have remained fairly stable over this decade and would have been intermediate between Detroit and Chicago in 1990 as it was in 1980.

Discussion

Poor local populations pay a heavy toll in the loss of potentially productive members in their prime of life. The size of this toll varies across disadvantaged populations and between men and women in the same population. African American men residing in persistently impoverished urban/northern localities face the most severely disadvantageous mortality profiles in their young adult through middle ages. This disadvantage became increasingly substantial over the 1980s.

Unlike those in urban/northern areas, rural/southern poor populations tend to experience little excess mortality relative to their respective sex and race specific national averages. There is clear evidence of this urban/northern—rural/southern divide among the African American populations, especially in 1990, and more modest evidence of it among whites. The rural/southern white populations tend to be better off economically than the urban/northern white populations, perhaps, explaining their mortality advantage. However, whites in Appalachian Kentucky were from the poorest white population, yet their mortality rates were lower than exhibited by poor white populations in the north, including the 1980 Detroit white population that had a poverty rate only somewhat higher than the white national average and one third the rate of the Kentucky population. Indeed, white residents of Cleveland and Detroit had mortality profiles roughly comparable to those of the rural/southern African American populations or to blacks nationwide despite having dramatically lower poverty rates.

For African Americans, the rural/southern populations tend to be as socioeconomically disadvantaged as (or, in some cases, more disadvantaged than) the northern/urban populations. Yet, as a group, they have substantially better mortality profiles than their counterparts in northern cities. These differences persist even after adjustment for cost of living differences.^{27 28} Despite their high poverty rates, the rural/southern African American populations experience mortality at comparable levels to the black national average and to the white urban poor populations.

The magnitude of the rural mortality advantage between poor populations far exceeds that estimated in analyses of national data sets that average across rural or urban populations. Such studies that find a rural advantage typically estimate it to be 2%–10%.^{8 15–19} Sex specific ratios of annualised death rates for specific rural compared with urban populations in this study yield a rural mortality advantage in 1990 that is never less than 20% and often exceeds 100%. These large differences suggest an important interaction be-

tween poverty, race, and residence that has not been previously noted. Among the poor, generally, and the African American poor, in particular, large gains in the probability of survival through middle age are associated with rural residence.

This important rural advantage is largely accounted for by a combination of lower rates of excess deaths attributable to circulatory diseases, cancer, and, in men, homicide, as well as a narrowing of the gap in accidental deaths that favour urban populations. As of 1990, deaths attributable to infectious disease played a relatively smaller part than might have been predicted in explaining growth in excess mortality in urban compared with rural areas. Further systematic study is warranted to illuminate the ultimate social or epidemiological processes that trigger these disparities. High levels of mortality in urban/northern central cities may be secondary to deterioration of urban infrastructure and city services.²⁹ Alternatively (or additionally) members of poor rural/southern communities might enjoy protections against deteriorating health conferred, for example, as some have speculated, by a greater degree of social cohesion³⁰ or a less sedentary or stressful lifestyle.^{16 19}

We did not find a uniform level or even direction of change over time among the study populations. National studies suggest social disparities in mortality have been growing among this age group.^{31–33} This study is not designed to answer that question on a national level, however, our findings suggest this is true in some poor localities but not others. Among the white populations, only Detroit experienced an increase. Between 1980 and 1990 the Detroit population declined in size and in level of economic well being. This selective out migration of economically better off residents might explain its worsening mortality profile. The picture for African American women was varied. Nationally and in Detroit, North Carolina, and Alabama they experienced declines in excess mortality over the decade, while in Harlem, Chicago, and Louisiana increases were evident. African American men nationwide and in urban/northern localities experienced mortality increases. Rural/southern men did not. These findings offer clues about where or why any broader growth in social inequalities in mortality may be occurring.

The contribution of homicide to changes in excess deaths between 1980 and 1990 is unremarkable. Differential experience with AIDS is important, although not fully explanatory. As of the early 1990s, AIDS seems to have played little part in excess mortality in poor populations outside of specific localities. Whether the epidemic remained contained in those areas requires further study. Harlem's experience suggests how devastating HIV disease can be for a local community. In one decade, it accounted for an additional 300 excess deaths per year among men and increased their average YOLL by more than two years. Excess deaths to a wide range of chronic and infectious diseases, as well as to accidents, play a larger

part than AIDS or homicide in explaining mortality increases over the decade.

The consistencies found across a diverse range of populations create some confidence that they represent underlying regularities that may be applicable to general categories of poor populations across the United States (for example, urban/northern compared with rural/southern). Yet, data requirements place limitations on our analysis. Because of population size requirements, we cannot distinguish between the effects attributable to being southern or rural and between being northern or urban. Vital statistics data were virtually never geocoded before 1980, ruling out a longer time series. Including disadvantaged representatives of other ethnic groups was not feasible (see footnote).

A complicated interpretive issue is that race and socioeconomic position are confounded in this analysis. The fact that we could not identify white populations as poor as the poorest black populations in the United States is itself suggestive of the relative importance of race in the United States as explanatory of inequalities in health, even if this social category (race) operates, in part, through economic characteristics to exert its effect on mortality.³⁴ However, while deeper poverty might contribute to the worse mortality experience of African Americans relative to whites, it cannot explain the specific instances where economically better off white populations fare as poorly as some more economically disadvantaged black. In addition, the heterogeneity among the African American populations studied is not so neatly summarised.

In summary, important differences exist among and within persistently impoverished populations by race, sex, geographical location, and time period in the degree to which their poverty translates into excess mortality. Some mortality differences are evident by age 45. More generally, mortality differences intensify between ages 45 and 65, resulting, in large part, from circulatory diseases and cancer. These findings support the broadening of social epidemiological inquiry and health promotion campaigns to focus on (1) characteristics of geographical areas and (2) the physiological effects of the psychosocial stresses of daily living experienced by the disadvantaged in the context of the specific localities they inhabit.³⁵⁻³⁷ Our findings document a poignant dimension of social disparities in health—that young people in some US communities cannot expect to survive through middle adulthood. While highly publicised

causes of premature death such as AIDS and homicide do contribute to this, they do so by adding to social disparities in mortality experience that are already substantial and result primarily from chronic disease in young and middle adulthood. This process indicating early health deterioration, evident before AIDs (in 1980) and in communities where, even in 1990, AIDS is not prevalent, may reverberate throughout communities. Community members pay a price in the loss of productive members and, perhaps, in expanded responsibility for dependent care falling to the young and middle aged adults who remain. This responsibility, itself, may exacerbate the risk of disease.

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Conflicts of interest: none.

Appendix

STUDY POPULATIONS

African American

Harlem

African Americans living in the Central Harlem Health Center District.

South Side Chicago

African Americans living in the Near South Side, Douglas, Oakland, Fuller Park, Grand Boulevard and Washington Park community areas.

Central City Detroit

African Americans living in the Central, University, Central Business District, Foch, Jefferson-Mack, Airport, St. Jean, Chene, and Jeffries subcommunities of Detroit.

East North Carolina

African Americans living in Pitt, Northampton, Halifax and Edgecombe counties.

Black Belt Alabama

African Americans living in rural counties in and around the Black Belt region including Dallas, Fayette, Greene, Bibb, Sumter, Hale, Lamar, Marengo, Marion, Perry, and Pickens counties.

Delta Louisiana

African Americans living in the Caldwell, East Carroll, Franklin, Jackson, Madison, Morehouse, Richland, Tensas, Union, West Carroll, Avoyelles, Catahoula, Concordia, Grant, La Salle, Vernon, and Winn parishes.

White

Cleveland

Whites living in the west-central area of Cleveland.

Detroit

Whites living in subcommunities on the north-eastern and southern periphery of Detroit, including Delray, Clark Park, Chadsey, Condon, Springwells, Jeffries, State Fair, Burbank, Denby, Finney, Mt. Olivet, Grant, Davison, Pershing, and Nolan.

For example, no Native American population is of sufficient size for fine grained mortality analyses among young and middle aged adults. Several problems are associated with attempting to study Latino ethnic populations in this way. These include: the inability to correct for census underenumeration; underreporting of Hispanic ethnicity on death certificates; and selective migration based on health status among Mexican or Puerto Rican populations—both a “healthy migrant” effect (the migration to the mainland United States of the more healthy) and a “salmon bias” (going back to one’s birthplace after becoming ill).

Appalachia

Whites living in the Appalachian Kentucky counties of Clay, Jackson, Knox, Lee, Leslie, Owsley, Rockcastle, and Wolfe.

West North Carolina

Whites living in Alleghany, Ashe, Avery, Mitchell, Watauga, Wilkes, and Yancey counties.

Northeast Alabama

Whites living in DeKalb, Jackson, and Marshall counties.

South Central Louisiana

Whites living in Acadia and Vermilion parishes.

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